

**WHAT IS CLAIMED IS:**

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1. A compact disk (CD), comprising:  
an audio portion for storing a first two track audio signal  
reproducible by playing said CD on a conventional audio CD player; and  
a CD-ROM portion, for storing data comprising:  
5 additional audio data; and  
control information, wherein said first two track audio signal  
and said additional audio data can be combined through use of said control  
information to reproduce a unified audio signal.
  2. The CD of claim 1, wherein said unified audio signal  
comprises a second two track audio signal of higher resolution than said first two  
track audio signal.
  3. The CD of claim 1, wherein said unified audio signal  
comprises more than two channels.
  4. A method of storing audio data on a CD, comprising:  
storing in the audio portion of said CD a first two track audio signal,  
wherein said first two track audio signal is reproducible by playing said CD on a  
conventional audio CD player;  
5 storing additional audio data on said CD outside of said audio  
portion; and  
storing control information on said CD, wherein said first two track  
audio signal and said additional audio data can be combined through use of said  
control information to reproduce a unified audio signal.
  5. The method of claim 4, wherein said unified audio signal  
comprises a second two track audio signal of higher resolution than said first two  
track audio signal.

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11. The method of claim 10, wherein said one or more second media is the CD-ROM portion of said CD.

12. The method of claim 11, wherein said control information is stored in the CD-ROM portion of said CD.

13. The method of claim 7, wherein said audio signal audio comprises more than two channels.

14. The method of claim 7, wherein said reproduction of said audio signal comprises a second two track audio signal of higher resolution than a reproduction based on said first two track audio signal alone.

15. A method for reproducing media stored audio information, comprising:

reading a first medium to extract therefrom a first two track audio signal;

reading information from one or more second media to extract therefrom data comprising:

one or more second audio signals; and  
control information;

reproducing said audio information from said first and second audio signals by use of said control information.

16. The method of claim 15, wherein said first medium is a rewritable memory.

17. The method of claim 16, wherein said first two track audio signal is compressed, further comprising:

decompressing said first two track audio signal prior to reproducing said audio information.

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15 a digital signal processor connected to said control processor and said first and second buffer memories, wherein said digital signal processor produces an augmented output signal by combining said additional audio information with said data read from said audio portion through use of input derived by said control processor from said control information.

24. The apparatus of claim 23, further comprising:  
an external input connected to said second buffer memory to provide said augmentation data.

25. The apparatus of claim 23, wherein said random access CD transport is connected to said second buffer memory to provide said augmentation data read from the CD-ROM portion of said CD.

26. The apparatus of claim 25, wherein said control processor is connected to said random access CD transport, whereby said control processor controls the reading of said CD so that said audio portion and said CD-ROM portion are read concurrently.

27. The apparatus of claim 26, further comprising:  
an external input connected to said second buffer memory to provide said augmentation data.

28. The apparatus of claim 23, further comprising:  
a digital to analogue converter connected to said digital signal process, whereby said augmented output signal is converted to an analog output.

29. The apparatus of claim 23, wherein said first and second buffer memories are contained within a single memory.



35. The method of claim 34, wherein the recording of said residual and the recording said control information are performed onto the CD-ROM portion of said CD.

B. 36. The method of claim 34, wherein said master recording is a digital recording characterized by an original sampling frequency, and wherein the deriving of said reduced digital reproduction comprises downsampling said master recording to a lower sampling frequency.

37. The method of claim 36, further comprising:  
upsampling said reduced digital reproduction to said original sampling frequency prior to forming said residual.

38. The method of claim 34, wherein said master recording is a digital recording characterized by an original number of bits per sample, and wherein the deriving of said reduced digital reproduction comprises truncating said master recording to a lesser number of bits per sample.

39. The method of claim 34, wherein said master recording is characterized by an original sampling frequency and by an original number of bits per sample, and wherein the deriving of said reduced digital reproduction comprises downsampling said master recording to a lower sampling frequency and truncating the resultant signal to a lesser number of bits per sample.

40. The method of claim 39, further comprising:  
upsampling said reduced digital reproduction to said original sampling frequency prior to forming said residual.

41. The method of claim 37, further comprising:

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47. The method of any of claims 42, 44, or 46, wherein said control information further includes data which characterize how said dither can be reversed.



48. The method of claim 34, further comprising:  
compressing said residual prior to its recording.

49. The method of claim 48, wherein said control information further includes data on how the compressing is performed.

50. The method of claim 33, wherein the recording of said reduced digital reproduction is performed onto a rewritable memory.

51. The method of claim 50, further comprising:  
compressing said reduced digital reproduction prior to its recording.

52. A compact disk (CD), comprising:  
an audio portion wherein is stored a first two track digital representation of a master recording, wherein said digital representation is reproducible by playing said CD on a conventional audio CD player; and  
a CD-ROM portion, wherein is stored data comprising:  
control information; and  
additional audio information, wherein said first two track digital representation and said additional audio information can be combined through use of said control information to reproduce second two track digital representation of said master recording, wherein said second representation is higher-resolution than said first representation.

53. The CD of claim 52, wherein said additional audio information is compressed.

54. The CD of claim 53, wherein control information contains data on how said additional audio information is compressed.

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55. The CD of claim 52, wherein said first two track digital representation is a dithered representation produced by a reversible dithering process, wherein said control information contains data used to perform said reversible dithering process.

56. A method of storing high-resolution audio data on a CD, comprising:

5 storing in the audio portion of said CD a first two track digital representation of said high resolution audio data, wherein said first two track digital representation is reproducible by playing said CD on a conventional audio CD player;

storing control information on said CD; and

10 storing additional audio data on said CD outside of said audio portion, wherein said first two track digital representation and said additional audio information can be combined through use of said control information to reproduce second two track digital representation of said high resolution audio data, wherein said second representation is higher-resolution than said first representation.

57. The method of claim 56, wherein said additional audio data is stored in the CD-ROM sector of said CD.

58. The method of claim 56, wherein said additional audio data is compressed.

59. The method of claim 58, wherein control information contains data on how said additional audio information is compressed.

60. A method for reproducing two track, high-resolution audio signal, comprising:  
reading a lower resolution representation of said audio signal;

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reading additional information, comprising:

additional audio information derived from said audio signal;  
reconstructing said two track, high-resolution audio signal from said  
lower resolution representation and additional audio information by use of said  
control information.

62. The method of claim 61, wherein said additional information is stored in the CD-ROM portion of said CD.

64. The method of claim 63, further comprising:  
subtracting reversible dither from said lower resolution representation  
psampling.

66. The method of either of claim 64 or 65, wherein the subtracting of reversible dither is performed using data extracted from said control information.

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72. The method of claim 71, wherein said first media is the audio portion of a compact disk (CD), wherein said two channel representation can be reproduced on a conventional CD player

73. The method of claim 72, wherein said recording of said control information is on said one or more second media, and wherein said one or more second media is the CD-ROM portion of said CD.

74. The method of claim 71, wherein M equals N.

75. The method of claim 74, wherein said residual contains (N-2) independent channels.

76. The method of claim 74, wherein said residual contains less than (N-2) independent channels.

77. The method of claim 71, further comprising:  
compressing said residual prior to its recording.

78. The method of claim 77, wherein control information contains data on how said residual is compressed.

79. The method of claim 71, wherein the deriving from said N-channel audio signal a two channel representation is based upon a linear combination of a finite set of spatial harmonics.

80. The method of claim 79, wherein said residual comprises a combination of zero and first order spatial harmonics which is linearly independent of said two channel representation.

81. The method of claim 71, wherein the recording of said first medium is a rewritable memory.

82. The method of claim 81, further comprising:  
compressing said two channel representation prior to its recording.

83. A compact disk (CD), comprising:  
an audio portion wherein is stored a two track reduction of an N-channel master recording, wherein N is greater than two, and wherein said two track reduction is reproducible by playing said CD on a conventional audio CD player; and  
a CD-ROM portion, wherein is stored data comprising:

control information; and

additional audio information, wherein said two track reduction and said additional audio information can be combined through use of said control information to reproduce an M-channel representation of said N-channel master recording, wherein M is greater than two but not greater than N.

84. The CD of claim 83, wherein said additional audio information is compressed.

85. The CD of claim 84, wherein control information contains data on how said additional audio information is compressed.

86. The CD of claim 83, wherein M equals N.

87. The CD of claim 86, wherein said additional audio information contains (N-2) independent channels.

88. The CD of claim 86, wherein said additional audio information contains less than (N-2) independent channels.

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89. A method of storing N-channel audio data on a CD, wherein N is greater than two, comprising:

storing a two track reduction of said N-channel audio data, wherein said two track reduction is reproducible by playing said CD on a conventional audio CD player; and

storing control information on said CD; and

storing additional audio data on said CD outside of said audio portion, wherein said two track reduction and said additional audio information can be combined through use of said control information to reproduce an M-channel representation of said N-channel audio data, wherein M is greater than two but not greater than N.

90. The method of claim 89, wherein said additional audio information is compressed.

91. The method of claim 90, wherein control information contains data on how said additional audio information is compressed.

92. The method of claim 89, wherein M is equal to N.

93. The method of claim 92, wherein said additional audio information contains (N-2) independent channels.

94. The method of claim 92, wherein said additional audio information contains less than (N-2) independent channels.

95. A method for reproducing an N-channel audio signal, comprising:

reading a two channel representation of said N-channel said audio signal from a first medium;

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101. The method of claim 100, wherein said additional audio information contains (N-2) independent channels.



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102. The method of claim 100 wherein the representation contains less than  $(N-2)$  independent components.

103. The method of claim 9 wherein the representation is based upon a linear combination of components derived from said  $N$ -channel audio signal.

104. The method of claim 103 wherein the representation comprises a combination of zero and first order components that are nearly independent of said two channel representation.

105. The method of claim 9 wherein the representation is contained in a rewritable memory.

106. The method of claim 10 wherein the representation is compressed, further comprising:  
expanding said two channel representation to a full channel representation.

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102. The method of claim 100 wherein the representation contains less than  $(N-2)$  independent components.

103. The method of claim 9 wherein the representation is based upon a linear combination of components derived from said  $N$ -channel audio signal.

104. The method of claim 103 wherein the representation comprises a combination of zero and first order components that are nearly independent of said two channel representation.

105. The method of claim 9 wherein the representation is contained in a rewritable memory.

106. The method of claim 10 wherein the representation is compressed, further comprising:  
expanding said two channel representation to a full channel representation.

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102. The method of claim 100 wherein the representation contains less than  $(N-2)$  independent components.

103. The method of claim 9 wherein the representation is based upon a linear combination of components derived from said  $N$ -channel audio signal.

104. The method of claim 103 wherein the representation comprises a combination of zero and first order components that are nearly independent of said two channel representation.

105. The method of claim 9 wherein the representation is contained in a rewritable memory.

106. The method of claim 10 wherein the representation is compressed, further comprising:  
expanding said two channel representation to a full channel representation.

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102. The method of claim 100 wherein the representation contains less than  $(N-2)$  independent components.

103. The method of claim 9 wherein the representation is based upon a linear combination of components derived from said  $N$ -channel audio signal.

104. The method of claim 103 wherein the representation comprises a combination of zero and first order components that are nearly independent of said two channel representation.

105. The method of claim 9 wherein the representation is contained in a rewritable memory.

106. The method of claim 10 wherein the representation is compressed, further comprising:  
expanding said two channel representation to a full channel representation.